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Gravel quarry processes

and the role of

public participation

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Emma Pearson

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Abstract of a Dissertation submitted in partial fulfilment of the requirements for the Degree of Master of Planning.

Gravel Quarry Processes And the Role of Public Participation

by

Emma Pearson

There are three main clusters of quarries in the Christchurch City area: Templeton, Yaldhurst and McLeans Island. The urban nature of the city means that these clusters sit close to rural residential communities. Quarrying has significant impacts on communities, and a rehabilitated quarry remains a part of the community after the quarry company has moved on. However, currently there are limited opportunities for public participation in the quarry and rehabilitation consent process. This research aimed to provide insight into the current quarrying and rehabilitation planning process in Christchurch and to suggest opportunities to enhance public participation in this process. In this research I utilised a document analysis approach as the research method. The quarry policies of the Christchurch District Plan were reviewed alongside the Resource Management Act 1991 and two Quarry Site Rehabilitation Plans. These documents were used to map out the resource consent process and the private plan change process, as well as provide case studies on the Templeton, Yaldhurst, and McLeans Island quarry areas. In both the resource consent process and the private plan change process, the opportunity for public participation is at the very end of the process, after the plans for the quarry activity has been finalised. Additionally, the proximity of the quarries to rural residential properties and the resulting exposure risk to crystalline silica dust creates a health risk. This risk has led to ongoing community conflict with the quarry companies. In regard to rehabilitation, there is no public participation in the formation of the quarry site rehabilitation plans, which fail to specify post-quarry

land uses. In this research, I recommended involving the community at the early stages of the planning process to enable community input on issues of community significance, such as setbacks and rehabilitation planning. This research highlights the need for more public participation in quarry and rehabilitation planning processes despite the possible challenges.

Keywords: Gravel Quarries, Quarry Rehabilitation, Community Conflict, Public Participation, Environmental Policy, Natural Resource Management.

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List of Abbreviations

AEE – Assessment of Environmental Effects

AQA – Aggregate and Quarry Association

CCC – Christchurch City Council

ECAN – Environment Canterbury (Canterbury Regional Council)

EPA Victoria – Environmental Protection Authority Victoria

IAP2 – International Association of Public Participation

NIMBY – Not-In-My-Backyard

LGOIMA –Local Government Official Information and Meetings Act

RFI – Request for Further Information

RMA – Resource Management Act

Chapter 1

Introduction

Gravel is a natural resource found on river banks or in alluvial soil deposits. Riverbank gravels are a regenerative resource as rivers wash gravel that has been worn away from the mountains down them every day. Alluvial soil deposits, however, are finite resources as the deposits are the result of ancient river beds leaving them behind (Christchurch City Council, 2018). In New Zealand, gravel, both from rivers and extracted from the ground, is an important resource for roading and construction. The Canterbury Plains have been formed by thousands of years of braided rivers weaving their way across the flatlands towards the Pacific Ocean. The geology of the Canterbury Plains means that there are both types of gravel deposits, river and soil deposits found across the Canterbury Plains.

In Canterbury, each type of gravel deposits is removed through an extraction process. Alluvial gravel deposits in soils are removed through an extraction process called quarrying. The process to extract gravel from a quarry is a long term yet temporary process (CCC, 2018). As quarrying is a temporary process, it is important to plan for the end of the quarrying works and what will happen to the site. Rehabilitation can achieve a number of outcomes, including; agricultural, ecological restoration, and recreational.

In this research, I will focus on the quarrying and quarry rehabilitation of the Christchurch City Council [CCC] managed area. In Christchurch, quarrying is managed at a city council level through the Christchurch District Plan (CCC, 2015). The sections of the District Plan used to manage quarrying are Chapter 17.2 Objectives and Policies, 17.8 Rules – Rural Quarry Zone, and 17.9 Rules – Rural Quarry Templeton Zone. Additionally, the Quarry Rehabilitation Plan Guidance is used to provide direction for Quarry Site Rehabilitation Plans. The rehabilitation plan and process, and where it is situated in the wider quarry planning process, will be the focus of this research.

In this research, I aim to evaluate public participation in quarry planning and quarry site rehabilitation planning. In evaluating the quarry consenting process, the aim is to identify opportunities to enhance public participation in the quarry and rehabilitation planning process.

The questions that the research aims to answer are:

- At what stages of the quarry consent processes does public participation occur?
- What opportunities are there to enhance public participation in the quarry consent process?

It is anticipated that answering these questions will provide insight into the current quarry and rehabilitation planning process in the Christchurch area, particularly with community participation.

This dissertation is divided into six chapters. The first of these is this introduction chapter. Chapter two is a literature and policy review that presents academic literature related to public participation in environment issues, quarrying and community conflict, and quarry rehabilitation. Additionally, it describes the current CCC objective, policies and rules relating to quarrying and quarry site rehabilitation. Chapter three describes the methodology used in this research, including the use of document analysis and case studies. Chapter four presents the results of the document analysis, which includes a breakdown of the two possible quarry consent processes and the case studies. The discussion in chapter five draws from the results with reference to academic literature and policy analysis. Finally, chapter six presents the summary of findings, possesses recommendations, offers suggestions for future research, and presents the limitation of this research.

Chapter 2

Literature Review and Policy Context

2.1 Introduction

In this section, I will review international research relating to public participation in environmental issues, quarrying and community conflict, and quarry rehabilitation. Public participation research will be used to show why public participation is important and what meaningful participation looks like in environmental issues. Community conflict in environmental issues commonly occurs due to differing attitudes towards rural land use, which is, particularly relevant to quarrying. Finally, rehabilitation is what happens to quarry sites after extraction is complete. This section will show the importance of quarry rehabilitation and its benefits for the economy, communities, and biodiversity.

2.2 Public Participation in Environmental Issues

Public participation has been theorised in a number of ways dating back to Arnstein in 1969. Arnstein (1969) developed the Ladder of Citizen Participation which described three different categories and eight types of participation, shown in Figure 1.1. The Ladder of Citizen Participation is designed to show who has the power in different decision-making models. The three categories were: citizen power, tokenism, and nonparticipation. Each category contained different types of participation, shown in figure 1.1. The citizen power category contained: citizen control, delegated power, and partnership. As the name described, the three types of participation in this category gave decision making control to the public, this control ranged from full citizen decision making control to shared control in a partnership. In the tokenism category the three types of participation are placation, consultation, and informing. Types of participation in this category gave the public input in the process but no decision-making power. Lastly, the nonparticipation category had two types of participation therapy, and manipulation. By describing public participation in this way, Arnstien (1969) was able to show that some public participation models are designed to empower communities while others are more tokenistic.

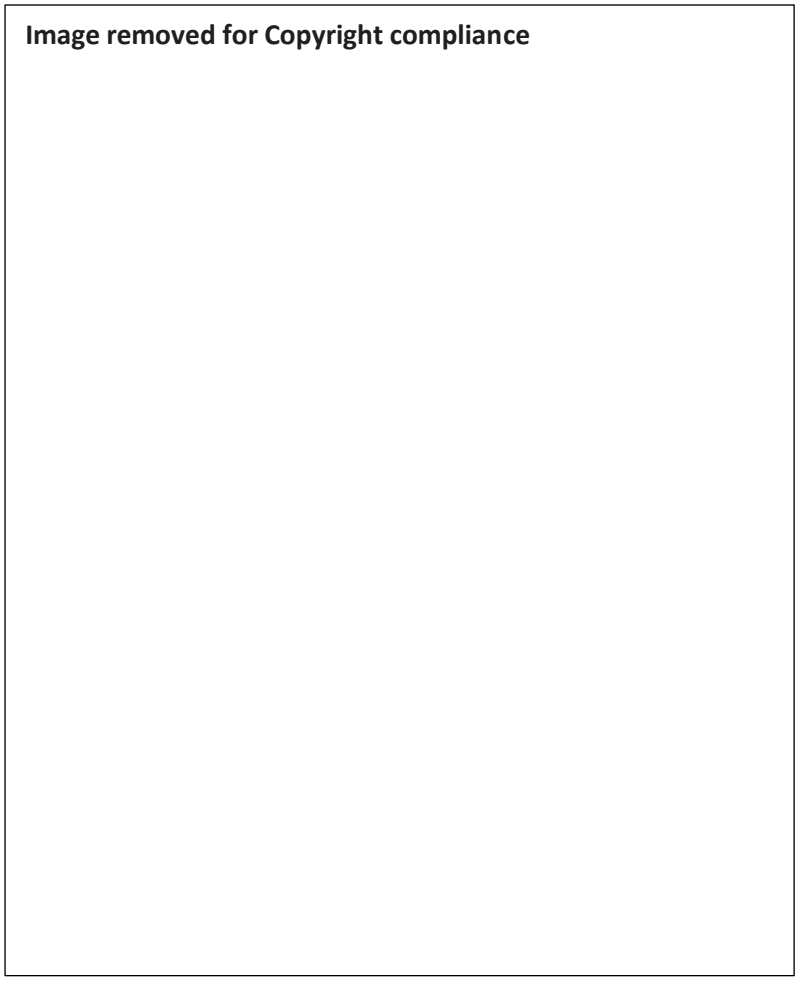

Figure 1.1: Image showing Arnsteins Ladder of Public Participation (Lithgow, 2006)

The International Association of Public Participation's [IAP2] spectrum of participation (2018), shown in figure 1.2, is based on similar principles to Arnstein (1969). The IAP2 spectrum of participation has five different approaches to public participation: inform, consult, involve, collaborate, and empower. Each approach describes a different goal for participation and the level of involvement the public have in decision-making. Each of the approaches make promises to the public. These are: Inform promises to keep the public informed, consult promises to inform, listen to, and acknowledge the public, involve promises to ensure the concerns and aspirations of the public are reflected in the decision, collaborate promises to seek advice, innovation, and solutions form the public, and finally empower promises to let the public make the decision and implement what they decide. Unlike Arnstein (1969), IAP2 focus

less on the motive of the participation and more on what type of participation is appropriate for the situation.

Figure 1.2: Table showing IAP2 Spectrum of Public Participation (IAP2, 2018)

The benefits of public participation are identifying solutions, increasing legitimacy, facilitating community empowerment and fostering social capital (Laurian and Shaw, 2007). Another benefit of public participation is that it aids in forming relationships that allow the public to be involved in the decision-making process. It can involve traditional methods such as public hearings and meetings or more contemporary methods such as Citizen Advisory Boards. Public participation is often used as a mechanism in environmental policy and planning to increase legitimacy and public acceptance (Wesselink, Paavola, Fritsch, & Renn, 2011).

Wesselink, Paavola, Fritsch, and Renn (2011) describe three main rationales for using public participation in environmental policy; instrumental, substantive, and normative. The instrumental rationale works on the theory that public participation makes decisions more legitimate and improves results; it does this by creating community ownership which limits future challenges. The substantive rationale believes that participation sees problems, issues, and solutions that experts miss allowing for the field of information to expand and therefore improve the quality of decisions. Lastly, normative rationale believes that democratic ideals require maximum participation in environmental decision making to allow for everyone who is affected by the decision to influence the decision. The three

rationale approaches to participation have significant impacts on the process and outcomes of public participation as it determines the facilitating approach.

Public participation is a widely used practice in environmental decision-making; however, there are criticisms of it. These criticisms come in two different forms; barriers to participation and weaknesses of the process. Barriers to participation are obstacles that prevent or discourage the public from participating. Laurian and Shaw (2007) explain that often participation methods, such as public meetings, are viewed by the community as tokenistic or merely a legal formality. Indicators of tokenistic participation are that the facilitating agency is uncommitted and unresponsive or that the facilitator is inexperienced or lacks knowledge of the issues. Barriers to participation can cause a number of issues. Chess and Purcell (1999) describe the common issue with participation as an over-representation of opponents to the issue. The second type of criticism of participation is based on the process. The main place that this criticism stems from is power issues (Calvalho, Pinto-Colho, and Eunice, 2019). Power issues occur when the public and non-government organisations are given weak roles and are often viewed only as recipients of information rather than as contributors. This often happens in situations where public participation is only being used to justify the decision that has already been made (Calvalho, Pinto-Colho, and Eunice, 2019).

Criticism of participation processes often stems from the failings of agencies or facilitators. This is because, in policy-making, public participation is often treated as if there can be a standardised approach to it. Calvalho, Pinto and Eunice (2019) found that the most significant influence on the perceived success or failure of a public participation process was management. This is because in most public participation processes the facilitating agency sets the agenda, frames the problem, and defines the scope of the public influence. When participation is a legal obligation for agencies, participation is often scoped to make participants react to a proposal rather than provide input (Chess and Purcell, 1999). When agencies incorrectly approach public participation, it creates a situation that Laurian and Shaw (2007) described as intimidating, unaccommodating, and lacking in fairness and transparency, which discourages participation and can lead to long-term distrust of the agency in the community.

In the context of quarrying practices, it is important to understand the intricacies of public participation because communities close to quarries can be heavily impacted due to the public health impacts and perceived effects on the quality of life that quarrying creates. Further to this, when public participation is meaningful, it empowers communities and results in better decision-making. Understanding what contributes to meaningful participation is significant to quarrying as quarry projects are long term, and fostering a working relationship with the community ensures long-term success. Working relationships with the community mean there is better understanding and communication, which aids in reducing conflict between communities and quarry companies.

2.3 Quarrying and Community Conflict

Traditionally in New Zealand, zoning for aggregate extraction and quarrying has been placed in rural areas. This has been done to limit the effect that quarrying activities have on individuals and communities. However, changes in rural community dynamics have meant an increase in a 'not-in-my-backyard' attitude towards quarrying. Luloff, Albrecht, and Bourke (1998) defined not-in-my-backyard syndrome (NIMBY) as local opposition to noxious or undesirable activities. NIMBY attitudes occur in a rural setting when urban residents move to rural settings to improve their quality of life by escaping the negative attributes of urban life, such as crime, pollution, and a faster pace of life (Sezer & Luloff, 2003). Issues occur when activities, regardless of whether they are traditionally rural activities or not, threaten this perceived quality of life.

Sezer and Luloff (2003) investigated what factors influenced negative attitudes towards a proposed limestone quarry in a small town in Pennsylvania. They found there were two main groups of people in the town, and each group had different attitudes towards the quarry proposal. The first group is referred to as the old-timers, and these are people who have grown up in the town and whose families are from the town. Sezer and Luloff (2003) found that, for the most part, the old-timers were positive towards the quarry proposal as the area of land with the limestone seam had been owned by a quarry company for decades before the proposal was submitted; therefore there was an acceptance of the idea that a quarry would operate in the town. The second group of people are referred to as the newcomers. The newcomers have moved to the town from urban areas, however, they still typically

work in these urban areas. Sezer and Luloff (2003) found that there were two main influences that meant that the newcomers typically opposed the quarry. The first is the perceived notion that it would disrupt the quality of life that they had moved to the country to seek, and the second is that they are financially independent of the local economy and therefore have the autonomy to oppose quarrying and other 'polluting industries' (Sezer & Luloff, 2003). Sezer and Luloff's (2003) results are significant as they show that there is diversity in communities regarding opinions on quarrying activities. The strength of the research is that it aids in showing different motivations for opinions regarding environmental conflicts, specifically quarrying issues. Understanding the motivations that drive opinions is a key factor in environmental problem-solving and important in creating planning approaches that minimise the effect of the conflict.

Sezer and Luloff's (2013) research shows the importance of problem-framing in environmental conflicts. Problem-framing is important to how the issue is defined, understood, and approached (Bardwell, 1991). Bardwell (1991) highlights that environmental problems are difficult to solve, complex, and highly political by nature. The goal of problem-framing is to redefine the problem in order for it to be seen from different perspectives. The strength of this approach is that it gives an opportunity to create conversations around an issue and leads to a greater sense of empowerment. In the case of Sezer and Luloff (2013), Bardwell's (1991) concept of problem-framing would have allowed for the old-timers and newcomers to see it from each other's perspective and therefore may have been able to reduce community conflict.

Hodge (2014) describes the changing rural values as creating a paradox. Mining companies are continually improving their environmental and social performance; however, community-mining conflict is increasing. Hodge's (2014) paradox is posed to have a negative impact on quarrying industries. It paints an ideal that no matter how much effort companies put into having better practices, both socially and environmentally, it will never be enough for communities. However, this paradox fails to recognise that community conflict aids in holding companies accountable. A stance was echoed by Bebbington (2014) in a response article to Hodge (2014). Bebbington argued that there is not a paradox but rather a precedent that mining companies should continually improve their

performance to meet community expectations and market demand. His argument centred on the idea that environmental conflict, particularly in the mining and quarrying industry, is healthy. It is healthy for the mining company as it holds them accountable for their actions and healthy for communities as it allows them to feel empowered and be heard.

The underlying motivations that impact community opinions of quarrying are significant to this research as they show what causes conflict between quarry companies and communities. Including communities in decision-making through a participation process can aid in creating relationships and therefore reduce conflict. This research aims to show that quarry site rehabilitation planning is a prime area to include communities in the decision-making as this determines the long-term use of the land, post-quarrying.

2.4 Quarry Rehabilitation

Quarry site rehabilitation is the process of returning the quarry site to a state suitable for subsequent land use (Gould, 2011). It is often promoted as a strategy for minimising environmental impacts from the mining activities, such as biodiversity loss, and is often legally mandated for quarrying activities. Depending on the intended rehabilitation method, quarry site rehabilitation requires backfill. Backfill is the process of restoring the quarry pit to ground level by filling it with cleanfill, which is natural soil and rock products that are known not to contain anything harmful (Gould, 2011). Different post-quarry land uses have different needs in the rehabilitation process. If the soil is restored to farmland, then backfill is enough; however ecological restoration or recreational uses require considerations beyond backfill. Gould (2011) found that rehabilitation for ecological restoration requires the consideration of vegetation, habitat, and ecosystems. Recreational uses of rehabilitated quarry sites require the consideration of soil types suitable for different uses, community needs, and future land-use changes (Vosloo, 2018).

There are three main uses of rehabilitated quarry sites. These are; farmland, biodiversity restoration, and recreational sites. This section will look at the strengths of each use, in terms of economical, ecological, and community value. Farmland is the most common post-rehabilitation land use as commonly this returns the land to its pre-quarrying use. To rehabilitate land for farming, the land does

not need much treatment to be suitable. The land considerations for farmlands are cleanfill, good drainage, and soil types (Festin et al., 2019). Farmland economically is a strength for rehabilitated land as it allows the land to be used for productive purposes. As there are few considerations for the land levelling, it is also an economical way for the quarry company to rehabilitate the site. However, in terms of ecological and community value, farmland has little value. Ecologically farming does not promote biodiversity as most farming relies on monoculture (Gould, 2011).

Biodiversity restoration, commonly referred to as habitat restoration, is promoted as a strategy for minimising the biodiversity loss caused when mining activity takes place in forest areas or creates a habitat where there was not one before (Gould, 2011). Gould's (2011) research focuses on bird habitat in a post-mine ecological rehabilitation area; however, the research findings have broad implications for the strengths of ecological restoration. While the research found that rehabilitation cannot achieve 'no net losses' in terms of species loss where mining has taken place in a previously species-rich area (Gould, 2011), it did find that after 23 years, two-thirds of the original bird-life had returned. The strength of these findings, when it comes to rehabilitation of quarry sites that had previously been farmland or unused land, shows that post-quarry, this land can be used to encourage biodiversity to the area. Ecologically the strengths of biodiversity-focused rehabilitation are strong; however, economically, the land is no longer available for agriculture and therefore could be seen as an economic loss. Like ecologically, the community strengths of biodiversity rehabilitation are strong as the rehabilitation area creates community benefits such as increasing property value and added recreational benefits (Damigos & Kaliampakos, 2003).

2.5 Summary / Research Focus

Currently, there is little research or focus on public participation in gravel quarry rehabilitation. Academic research surrounding quarries falls into two categories; environmental conflict and rehabilitation. Research looking at environmental conflict surrounding quarries focuses on the community conflict during the proposal and extraction stages of quarrying. There is no current research on community relations after the completion of the extraction stage. The second focus is rehabilitation, which looks at the ecological and community benefit of restoration, however does not

look at community involvement in rehabilitation planning. Currently, there is no research that investigates the overlap of these two research areas in regards to quarrying. This is the gap that this research aims to fill.

There is also a similar gap in CCC quarry policy and plans. The key policy and rules that apply to quarrying in the Christchurch District Plan are 17.2.2.12 Policy - Location and management of quarrying activity and aggregates-processing activity, 17.2.2.13 Policy - Quarry site rehabilitation, 17.8 Rules - Rural Quarry Zone, and 17.9 Rules - Rural Quarry Templeton Zone (CCC District Plan). Specifically of note for this research are the rehabilitation rules set out under 17.8.3.14 Quarry site rehabilitation - Quarrying activity and 17.9.4.11 Quarry site rehabilitation, neither of which require community participation in the preparation process of a quarry site rehabilitation plan. The CCC has also prepared the Quarry Rehabilitation Plan Guidance (CCC, 2018), which was written to assist quarry operators in preparing quarry site rehabilitation plans. The Quarry Rehabilitation Plan Guidance does not mention public participation.

The public participation gap in quarry site rehabilitation planning and the wider quarry planning process is the focus of this research for two key reasons. The first is that once quarrying activity is complete and the site is rehabilitated, the community are the ones that have to live with the results of the rehabilitation yet currently they have no say; and secondly, public participation creates relationships and opens lines of communication which may be able to de-escalate some of the conflicts at the planning stage of quarrying.

Riverbank gravels are managed by Environment Canterbury Regional Council [ECAN], and the extraction is managed so that the flow of the river is not affected and so that there is no exacerbation of flood risk. Riverbank gravel extraction is not included in this research as this research aims to focus on on-site rehabilitation, which is not needed in riverbank extraction as ECAN manages effects by limiting the amount that can be extracted; therefore, this process is outside the research scope. However, ECAN controls contents to discharge to land, water, and air as well as water, and takes consents for all of Canterbury. Gravel quarries require these consents to operate, therefore, from that

perspective, the ECAN objectives, policies, and rules for Christchurch – West Melton laid out in Section 9 of the Canterbury Land and Water Regional Plan (ECAN, 2016) have been taken into account.

Chapter 3

Methodology

3.1 Introduction

This chapter sets out the methodology adopted to guide this research. Document analysis data has been collected and examined to map out the resource consent process and private plan change process as well as create three case studies; Templeton, Yaldhurst, and McLeans Island.

3.2 Documents

This research has utilised a document analysis approach as the research method. The advantages of this approach are that documents provide a broad range of information which allows the research to draw on a number of different fields and perspectives, which will provide a well-rounded platform for discussion. As documents cover a long span of time, a document analysis approach can show how approaches and practices have developed over time (Bowen, 2009). Additionally, a document analysis method was selected because the public health risks created by Covid-19 meant that semi-structured interviews would put both the participant and the researcher at risk, and therefore were an unviable option.

Relevant CCC documents, policies, objectives, and rules have been collated to provide an overview of the gravel quarry planning process, specifically the quarry rehabilitation planning process. The key policy and rules that have been analysed in this research are Christchurch District Plan (2015) particularly; 17.2.2.12 Policy - Location and management of quarrying activity and aggregates-processing activity, 17.2.2.13 Policy - Quarry site rehabilitation, 17.8 Rules - Rural Quarry Zone, and 17.9 Rules - Rural Quarry Templeton Zone. Specifically of note for this research are the rehabilitation rules set out under 17.8.3.14 Quarry site rehabilitation - Quarrying activity and 17.9.4.11 Quarry site rehabilitation. Additionally, the CCC Quarry Rehabilitation Plan Guidance has been used as an aid in analysing two current Quarry Rehabilitation Plans in Christchurch and the Winstone Aggregates Yaldhurst rehabilitation plan (Winstone Aggregates, 2020).

The RMA (1991) was used to map out the processes used to gain consent for gravel quarries. These processes are the resource consent process and the private plan change process. These processes have been broken down into three categories; pre-application and preparation, consideration by council, and decision.

3.3 Case Studies

Additional to analysing the planning process and policy documents, I will provide three short case studies of Templeton (Pound Road), Yaldhurst, and McLeans Island. The case studies will be used to create an understanding of the quarry activity in the CCC jurisdiction. Each case study will be a detailed examination of a geographical area where quarrying activity takes place.

I have focused on the Templeton quarry area, the Yaldhurst quarry area, and the McLeans Island quarry area. For each case study, I have provided the planning context of the quarrying activity, the current state of quarrying activity and community relations, and the rehabilitation planning and level of public participation involved in the project. To create the case studies I have analysed the consents and zoning for each quarry, provided context of the community conflict through media articles and community surveys, and analysed quarry site rehabilitation plans where available.

As part of the case studies I have included maps of the quarry areas and of the Airport Protection Zone. These maps were created using Canterbury Maps, specifically the Christchurch District Plan layer (Canterbury Maps, 2020). The case study maps have been edited to correctly indicate the quarry areas, the editing was done using the drawing tools within Canterbury Maps. Labels on these maps were added later in word.

To investigate the history of the quarry sites in the Christchurch area, I have used historical consent information. Quarries in Christchurch have to gain consent from CCC and ECAN in order to be able to operate. CCC, however, does not have a digital database for consents, and due to time constraints, I was unable to apply for an Local Government Official Information and Meetings Act 1987 (LGOIMA) request for information. ECAN has an online searchable database, https://www.ecan.govt.nz/data/consent-search/, of both current and lapsed consents that I have used to gain information about the discharge and water consents for the quarries that have been

investigated. Consents were searched by company and I used the related consents tool to find previous as well as replacement consents. This allowed me to track when discharge and water consents in order to create a timeline of when the current operational quarries in Christchurch were first given consent. This aided in the formation of the case studies.

3.4 Meeting with Council

In January 2021, I had a meeting with Emma Chapman, a Senior Planner at the CCC. In this meeting, I discussed gravel quarry processes and rehabilitation planning in Christchurch City in Emma's professional capacity. This meeting was used to gain insight into the quarry consent process in Christchurch and gain information that can not be found in a document analysis.

Chapter 4

Results

4.1 Introduction

This chapter presents the results and findings from the document analysis. The chapter begins with a description of the policy context and maps out the resource consent process and private plan change process. Then, provides the planning context, current state, and rehabilitation for the three case studies: Templeton, Yaldhurst, and McLeans Island.

4.2 Plan Change

In 2006 the Banks Peninsula District Council amalgamated with the Christchurch City Council. Following the amalgamation, Christchurch City Council ran both the Christchurch City Plan and the Banks Peninsula District Plan as operational until 2014. In 2014 the Christchurch City Council placed both plans under review using provisions in the Canterbury Earthquake (Christchurch Replacement District Plan) Order 2014. The outcome of this was a single replacement plan which covers both district areas. The transition to the replacement plan created two district categories of quarry consents within the Christchurch City Boundary; pre-plan change quarries and post-plan change quarries. This section will outline some of the differences between the two categories and the effects of the rule change.

The primary difference between the two categories is rehabilitation, specifically the requirement of rehabilitation plans. Pre-plan change, there was no requirement for rehabilitation plans. While there was a requirement that staged rehabilitation was done, there was no requirement to submit a detailed rehabilitation plan pre-consent. This largely left the rehabilitation up to the quarry owners, with no mechanisms to ensure that the rehabilitation was well-rounded or effective. Emma Chapman (personal communications, January 19 2021), Christchurch City Council Consent Planner, has indicated that there was no integrated rehabilitation prior to the plan change. The plan change meant that new quarry consent applications were now required to submit a thorough quarry site rehabilitation plan that adheres to the Quarry Rehabilitation Plan Guidance for Christchurch City to get consent. The post-

plan change rules and the introduction of the Quarry Rehabilitation Plan Guidance have meant that new quarry sites and historic sites wishing to expand are required to ensure rehabilitation is integrated, staged, and effective. The introduction of these mechanisms intends on having the goal of ensuring that the post-quarry land use is planned for from the start of the quarry.

Post-plan change, there are substantially more mechanisms to ensure that quarry site rehabilitation is well-rounded and effective. However, resource consents granted post-plan change are still in extraction phases and will not be at the rehabilitation stage of the quarry process for around 30 years. The second reason is that there are very few historic Christchurch quarries with rehabilitation plans. Emma Chapman (personal communications, January 19 2021), stated that historic quarries that got consent pre-plan change were given two years to submit a quarry rehabilitation plan. However, some companies have refused to submit plans, claiming that as they had consents under the old rules, they had existing use rights.

4.3 Gaining Consent for Quarrying Activities

Under the RMA, there are two key ways to obtain consent to do an activity; resource consent and private plan change. A resource consent process happens when an applicant seeks to apply for a controlled, restricted-discretionary or discretionary activity. Resource consents can be sought from a regional or district/city council, or both, depending on which one has jurisdiction over the area you intended to do the activity. A private plan change is an extra process before the resource consent process and occurs when an applicant is seeking to do a non-complying or prohibited activity. The private plan change process is a spot rezoning process. This means that the applicant applies to change the rules for activities in a discrete area in order to be able to apply for resource consent. For example, if in a rural zone quarrying activity is non-complying, then an applicant would need to apply to rezone a discrete area to a quarry zone to be able to apply for resource consent to undertake any quarrying activity in the area. This section will outline the resource consent and private plan change processes and how they apply to quarry consents in the Christchurch City area.

4.4 Resource Consent Process

The resource consent process has three main stages, preparation and pre-application, consideration by council, and decision.

For a new quarry consent, the preparation and pre-application stage is undertaken by the quarry company. After selecting a quarry site, the quarry company can start the preparation stage of the process. The first details a quarry company will have to consider are the types of consent required and the relevant councils (RMA, s87). In Christchurch city, a new quarry application needs to get consent from the Christchurch City Council for gravel extraction and any building on the site. They also require consent from Environment Canterbury [ECAN] for water use and any discharge. The next details to consider are the zonings for the selected site and the activity category (RMA, s87A). Lastly, quarry companies will need to determine whether an Assessment of Environmental Effects [AEE] is required; if so, the applicant will need to scope and prepare the AEE (sch4). During the preparation stage, the applicant has the option of having a pre-application meeting with a Council Planner to ensure the application is up to standard.

The second stage of the process is the consideration by the council. The key components of the consideration stage are the assessment of the AEE, request for further information [RFI], decision to notify, and the decision of the conditions and duration of consent (RMA, s92). The timeframe of this stage of the process is determined by the need for an RFI or to notify the consent. This means that the timeframe of the consideration by the council can vary greatly, from a minimum of 30 days to over a year for more complicated consents.

A significant component of the consideration by council stage is the decision to notify, and the process that follows that decision. There are three options for the notification: non-notified, limited notification, and notification. Non-notified consents are considered to have less than minor effects on the environment and do not have to go through the notification process. However, limited notification and notification are both deemed by the consenting authority to have more than minor effects and need to go through the notification process. Quarry consents are typically determined to have more than minor effects due to the extraction of gravel and the risk that quarrying poses to groundwater,

and therefore require a notification process. A limited notification process means that under s95B of the RMA (1991), only affected groups or parties are notified of the consent application and are entitled to make a submission; this includes those that have customary rights and customary marine rights. A notification process means that the public is notified of the consent application and are entitled to submissions. Under both processes, the public is given 20 working days to make a submission to the consent authority. At the conclusion of the notification process, the application can move to the decision stage unless the quarry company or a submitter has requested to be heard at a public hearing. In the event a hearing has been requested, the council must hold a public hearing before the application can move to the decision stage of the process.

The final stage of the resource consent process is the decision. The decision either approves or declines the consent application. It also lays out the conditions that the council has imposed on the quarry company and determines the duration of the consent.

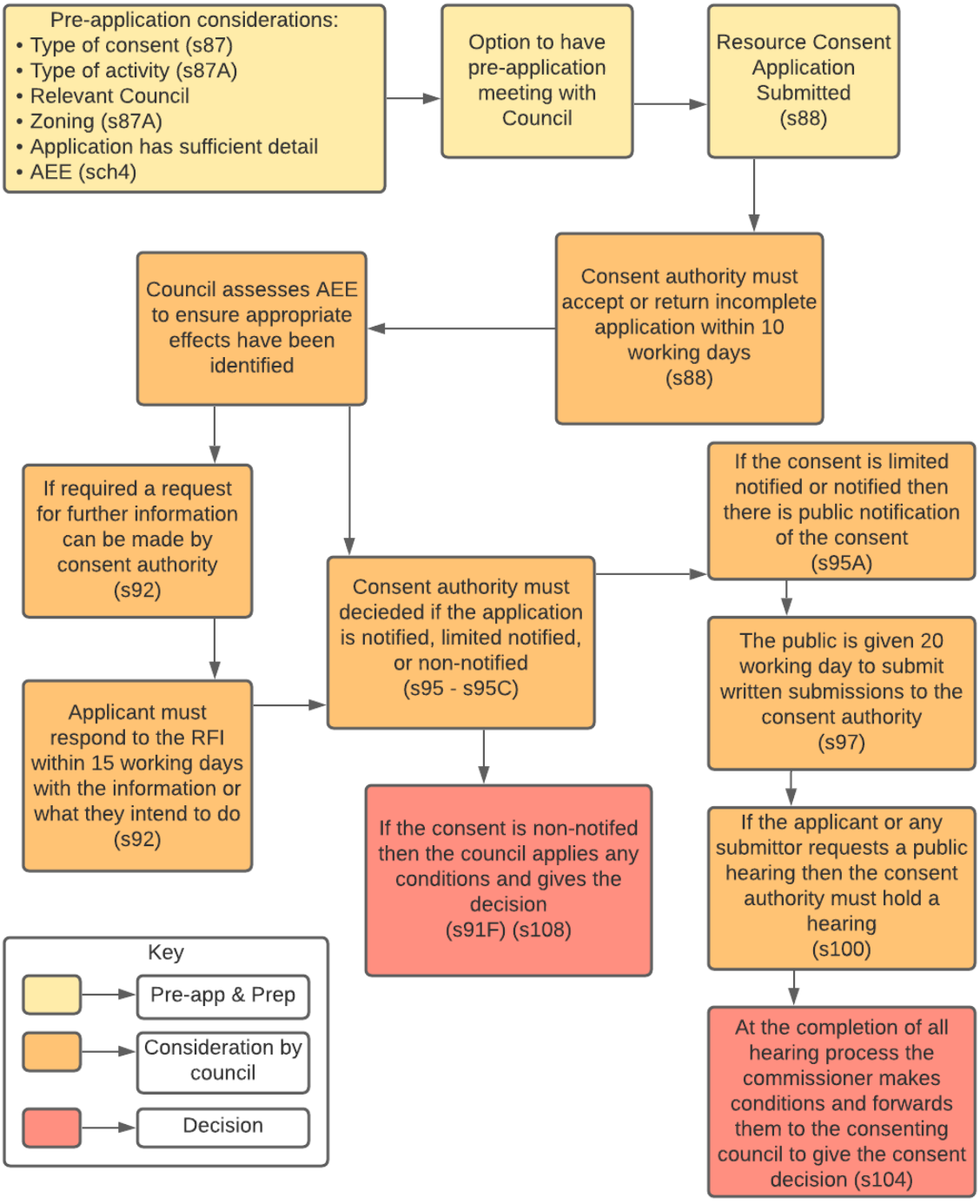

Figure 4.1: Diagram showing the resource consent process. Diagram developed from the RMA (1991)

4.5 Private Plan Change Process

Like the resource consent process, the private plan change process has three main stages: pre-application and preparation, consideration by the council, and decision.

The pre-application and preparation stage starts when a company selects a site for quarrying where quarry activity is a non-complying or prohibited activity. The quarry company needs to draft a set of rules that would make quarrying activity permitted, controlled, restricted discretionary, or discretionary on the selected site. Alternatively, if the district plan has quarry zones already, as the Christchurch District Plan does, then the quarry company can apply to rezone the selected site as a quarry zone meaning that quarry activity in that area would align with the objectives and policies of the plan.

Once the new rules or spot rezoning has been completed, the quarry company send this to the council for consideration. The council has three options in a private plan change; they can accept, adopt, or return it to the applicant as it should be considered as a resource consent. Accept means that the council rezones the specific site or changes the plan to the rules exactly as presented by the quarry company in the application. When the council accepts an application, the cost falls with the applicant as the only party that will benefit from it is the applicant, as the rules have only been changed for the selected site. Adopt is where the council can see a wider benefit from the rules presented by the applicant and chooses to apply them on a larger scale as part of a plan change. This can include changing the zoning of an area, including the selected site, so that quarrying and other previously non-complying or prohibited activities are now permitted, controlled, restricted discretionary, or discretionary. It can also include changing rules within a zone to include the rules set out by the quarry company and other rules to form a larger scale plan change. If the council chooses to adopt the cost of the plan, change falls to the council as the result of the change will affect a large range of groups. Finally, the quarry company's third option is to return the application for it to be resubmitted as a resource consent application. This would happen when quarrying activity is already a discretionary activity in the selected site area, but the quarry company is applying with the intent of making the restricted, discretionary or controlled, to make it easier to get consent. While the option itself is part

of the consideration stage of the private plan change process, returning the application to the quarry company is part of the decision stage of the process.

If the council chooses to accept or adopt the private plan change application, the application then goes through two rounds of public submissions. The first round of public submissions is an open round of submissions. This means that the public can make submissions on any topic related to the application. At the conclusion of the first round of public submissions, a summary of key topics highlighted by the submissions is created. The summary is then the basis for the second round of submissions which can only be on the topics highlighted in the first round. If the applicant or any submitters have requested to be heard at a hearing, then the council must hold a hearing.

At the completion of the public submissions or the hearing, the application then moves to the decision stage of the process. If the application has been approved, then the rules become active, and the quarry company can now apply for consent to quarry on the selected site under the new rules.

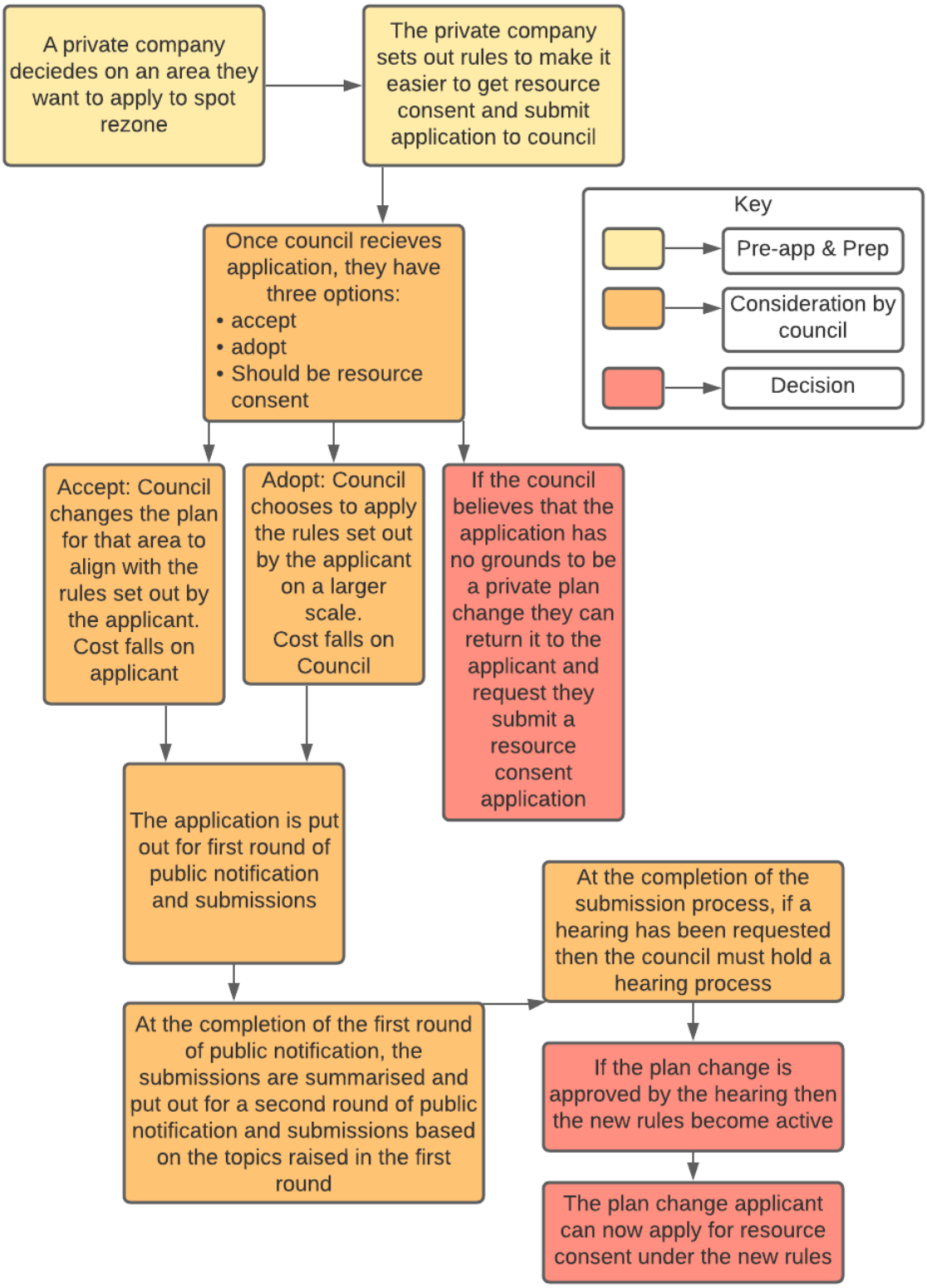

Figure 4.2: Diagram showing private plan change process. Diagram developed from the RMA (1991).

4.6 Christchurch City Council Quarry Consents

In the CCC area there are two types of quarry zoning; Rural Quarry Zone and Rural Quarry Templeton Zone (CCC, 2015). These areas cover the majority of the viable quarry land within the Christchurch City boundary. In these areas large-scale quarrying activity has a restricted-discretionary or discretionary activity status. The majority of CCC quarry consents are gained through a resource consent rather than a private plan change (Emma Chapman, personal communications, Jan 19 2021). This is because quarry companies can get resource consent for large-scale quarry activity under the rules as they stand due to the two quarry zones. This means that there is no need to risk the added expense of going through the private plan change process. Private plan changes are an extra process to go through before a quarry company is able to start the resource consent process making the process costly unless the council chooses to adopt the proposed changes, however, that makes it a significantly longer process. However, the current Rural Quarry Zone and Rural Quarry Templeton Zone rules do not have mechanisms for the retention of aggregate processing facilities on a site after the quarry site rehabilitation has been completed. This is of note as Winstone Aggregates and other quarries have expressed interest in keeping processing facilities on their current sites (Winstone Rehabilitation Plan, 2020, and Emma Chapman, personal communications, Jan 19 2021) and would require a private plan change to be able to do so.

4.7 Templeton (Pound Road) Case Study

4.7.1 Planning Context

The Fulton Hogan Pound Road Quarry is the only large-scale quarry operating in the Templeton area. Located between Pound Road and Hasketts Road, shown in figure 4.3, the roughly 95-hectare site has been operational since 1992 (Environment Canterbury, 2021. Canterbury Maps, 2017). The site was a convenient location for a quarry as it was located in a rural zoned area and also is inside both the Christchurch Airport Protected Area and the Motor Sport Noise Boundary for Ruapuna Speedway (Canterbury Maps, 2020). The Christchurch Airport Protected Area (CCC, 2014, C13.3) and Ruapuna Speedway Motor Sport Noise Boundary (CCC, 2014, C13.10) are areas of land protected from urban development and subdivision to avoid the noise the venues make, causing reverse sensitivity on new residential areas. This meant that when the quarry was first opened, the noise and dust created by quarry activity had a minimal effect on the surrounding community due to the undesirable rural setting.

Figure 4.3: map showing the Fulton Hogan Pound Road, Templeton Quarry (red box) as well as Ruapuna Speedway and its noise boundaries (purple). The inner purple ring is the internal noise boundary and the outer purple ring is the external noise boundary (CCC, 2014, C13.10). The red box shows the indicative area of the Fulton Hogan Pound Road Quarry. Map modified from Canterbury Maps.

Since its opening, the Pound Road Quarry has been a key supplier of aggregate resources for Christchurch City as the city has grown in the last three decades. The site's proximity to Christchurch City meant that it was heavily relied on in the decade following the 2011 Christchurch Earthquakes for resources related to the rebuild of the city (Fulton Hogan, 2021). The cities rapid demand for aggregate resources during the rebuild meant that the Fulton Hogan Pound Road Quarry was depleted of its gravel resources quicker than previously expected (Fulton Hogan, 2021).

Following the 2011 Christchurch Earthquake, the western urban fringe areas of Christchurch City saw rapid suburban expansion due to the community displacement caused by the red-zoned land in eastern Christchurch, and large areas of previously rural land turned into subdivisions. This meant that the previous rural buffer between the Fulton Hogan Pound Road Quarry and suburban housing became substantially smaller. The expansion of the surrounding suburbs, notably Templeton and Islington, meant that the effects of noise and dust from the quarry became far more of an issue.

4.7.2 Current State

Fulton Hogan (2021) estimate that they have four more years of gravel extraction feasible on the Pound Road site. With consent granted for the new Roydon Quarry located on Jones Road, shown in figure 4.4, it is expected that the Pound Road Quarry will be permanently closed, and rehabilitation will begin. The Roydon Quarry, which will replace Pound Road, is located in the Selwyn District. The current consent, CRC203054, for the Pound Road Quarry is valid until 2028 (ECAN, 2021); however, due to rapid resource depletion following the Christchurch Earthquake, the quarry will close before the consent expires.

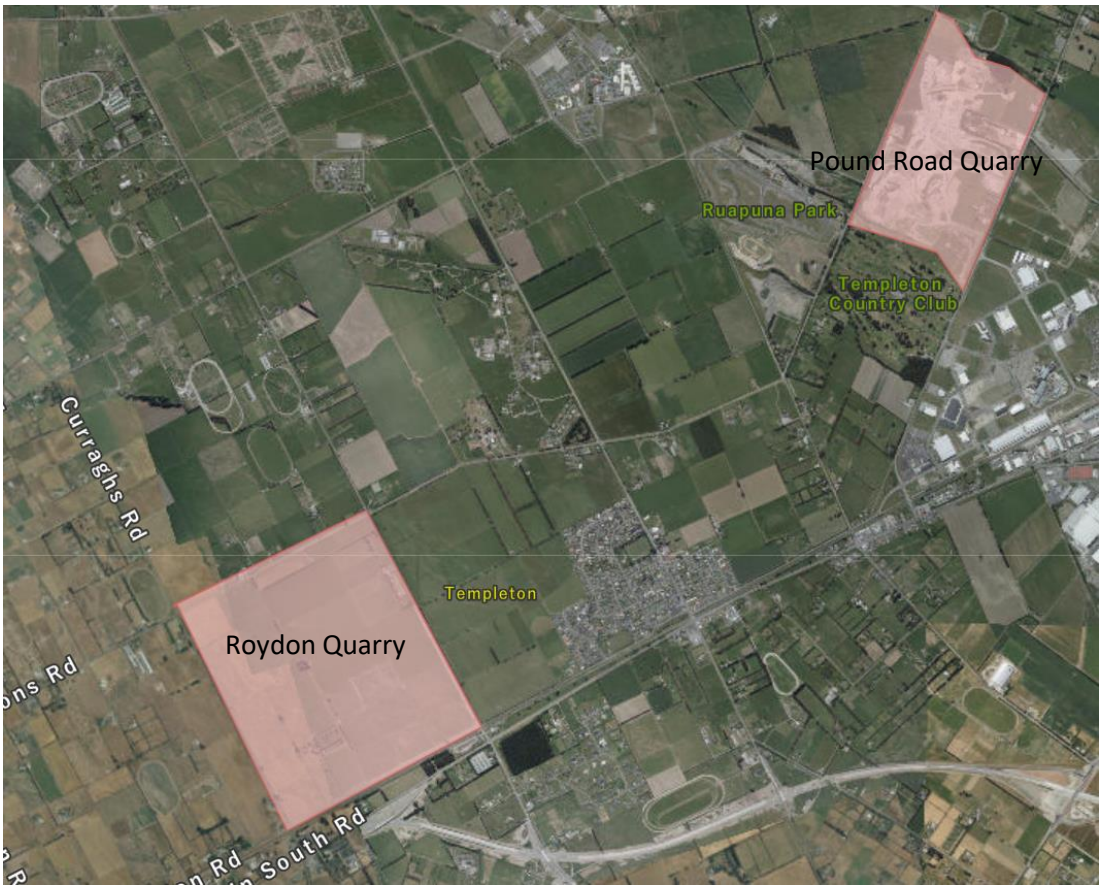

Figure 4.4: Map showing the Pound Road Quarry and the new Roydon Quarry, as well as the Templeton township. Red boxes show the indicative area of the two quarries. Map modified from Canterbury Maps.

The narrowing of the rural buffer zone between the Pound Road Quarry and the western urban fringe has meant currently there is a large amount of community conflict between the Templeton and Islington communities and the quarry. This is largely to do with the dust produced by the quarry. While noise is of concern, the community issue has largely been centred around the presence of crystalline silica in the dust. Crystalline silica is a mineral found in sand, stone, and gravel that can cause silicosis, which is a fatal disease (Mitchell, 2017).

4.7.3 Rehabilitation

Fulton Hogan first got resource consent for the Pound Road Quarry under the pre-plan change rules. This means that there is no Quarry Site Rehabilitation Plan; however, rehabilitation is still required as the pre-plan change rules still mandated rehabilitation. Due to the lack of a plan, it is unclear how Fulton Hogan intends on rehabilitating the site or what the post-quarry land use will be.

4.8 Yaldhurst Case Study

4.8.1 Planning Context

The Yaldhurst Quarry cluster between Old West Coast Road and West Coast Road is a 365-hectare area bordered by Buchanans Road and Miners Road, shown in figure 4.5. The cluster began in the late 1960s when Firth Industries opened a quarry on the corner of Old West Coast Road and Miners Road This quarry was taken over by Winstone Aggregates, a division of Fletchers Concrete and Infrastructure, in 1993 (Winstone Rehabilitation Plan, 2020). Around the early 2000s, Winstone Aggregates were joined by six other quarry companies: Fulton Hogan, Blackstone, Ready-Mix and KB Quarries in 2002, Road Metals in 2007, and Taggarts in 2009 (ECAN, 2018).

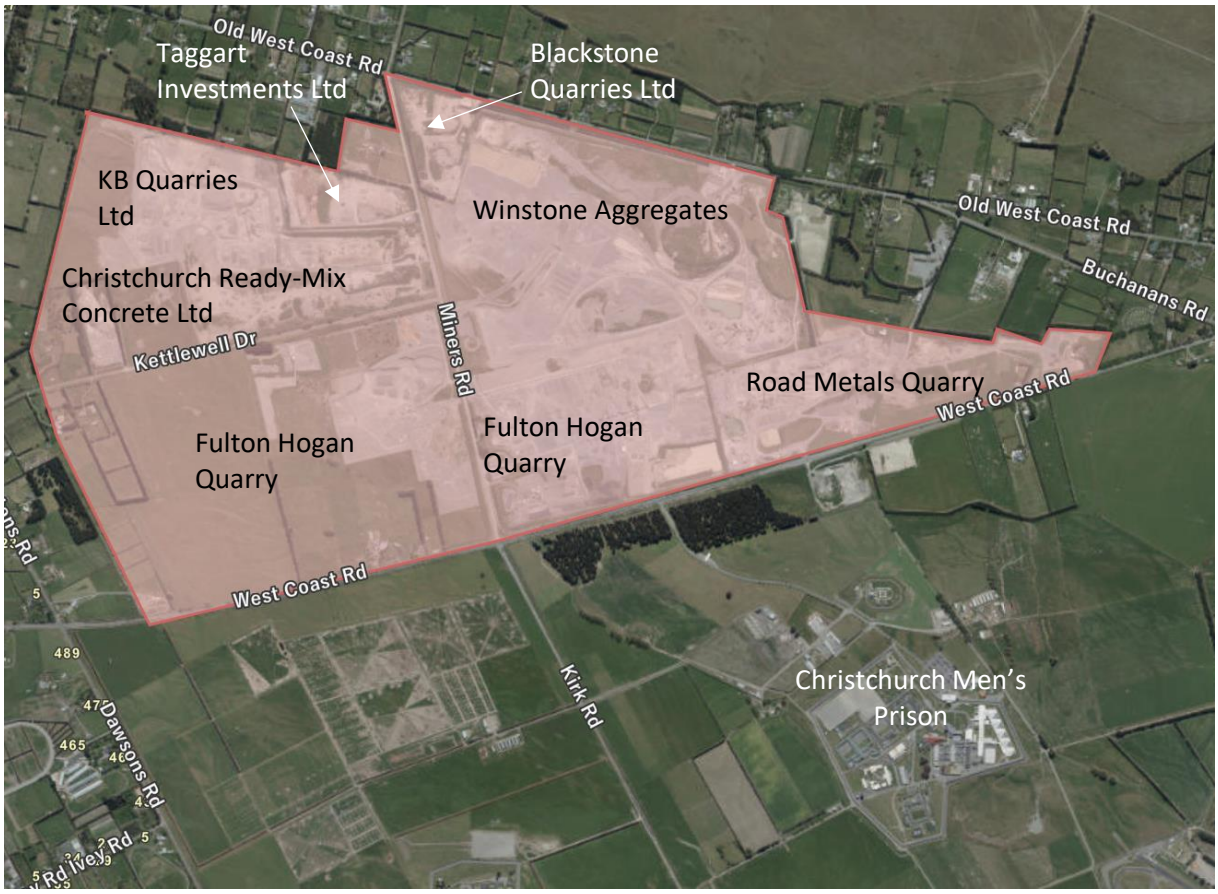

Figure 4.5: Map showing the Yaldhurst Quarry cluster and the Christchurch Men's Prison land hold. The red box shows the indicative area of the seven quarries in the Yaldhurst Quarry. Map modified from Canterbury Maps.

The area is part of the Rural Quarry Zone (CCC, 2014) and part of the Christchurch Airport Protected Area, shown in figure 4.6. The West Coast Road edge of the area borders rural industrial land use and land set aside for the Christchurch Men's Prison land hold (CCC, 2015, C10I). However, the Old West Coast Road edge of the area has a number of rural residential dwellings along it, as can be seen in figure 4.5. In 2017 an article was published stating that six homes are within 200 metres of Winstone Aggregates, and one is 90 metres from the quarry site (Mitchell, 2017). The current Christchurch City Council set back between dwellings and quarrying activity is 80 to 100 metres.

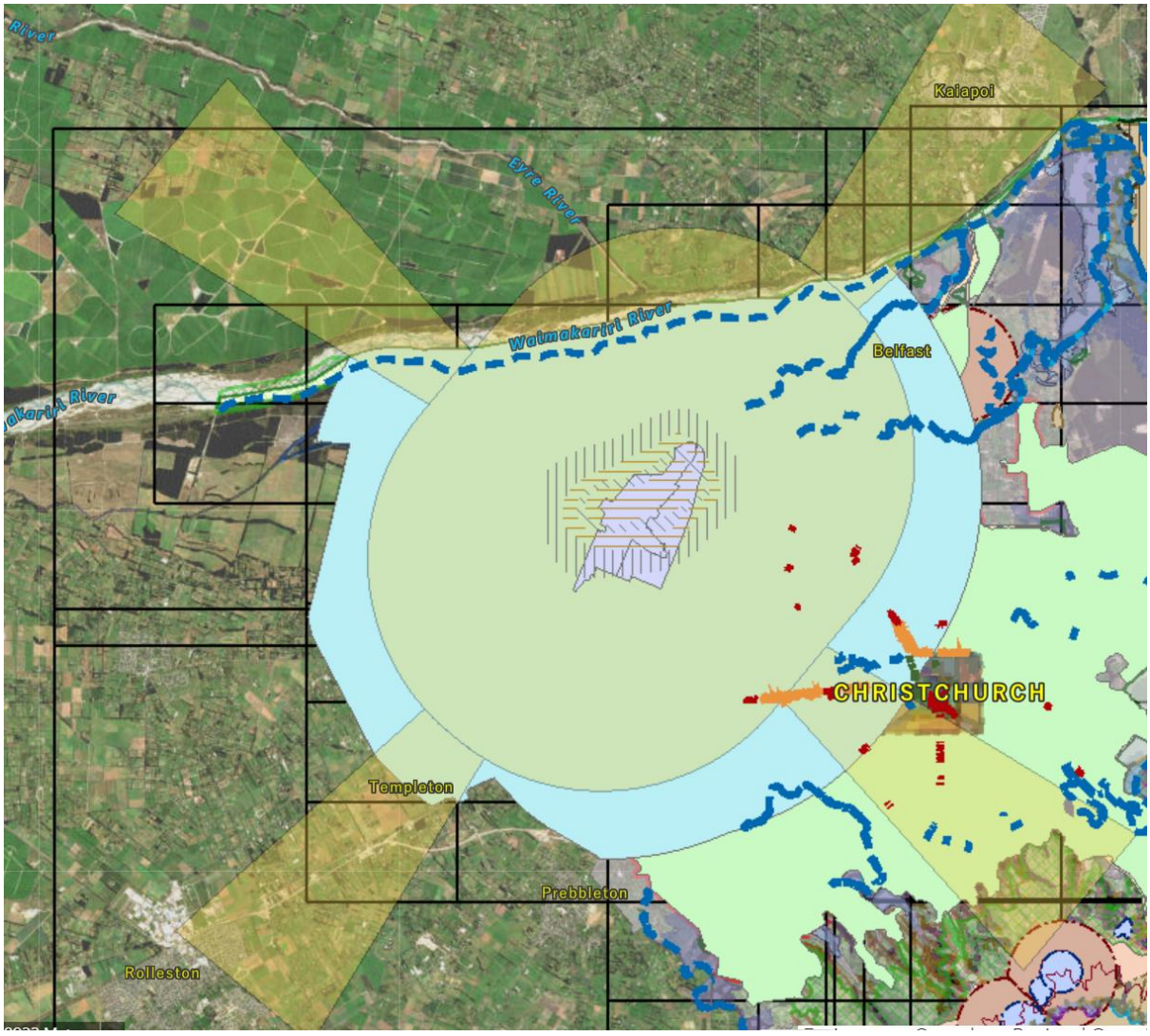

Figure 4.6: Map showing the Airport Protection Area. Layer in yellow shows the Airport Noise Protection area and the light blue layer is the Bird Strike Protection Zone. Map modified from Canterbury Maps.

4.8.2 Current State

Yaldhurst residents have been concerned about the dust and the possible presence of crystalline silica since 2017. In March 2017, an article was published highlighting the effects of the 2014 Winstone Aggregates expansion on the surrounding dwellings and community (Mitchell, 2017). In late 2017 the Yaldhurst residents raised concerns with ECAN over the health effects caused by the presence of crystalline silica dust on their properties. In response to the concerns, ECAN found that there was a need to, "understand the scale and magnitude of the risk of dust to residents" (ECAN, 2017). To do this, ECAN set up a comprehensive air quality monitoring programme in March 2017. This monitoring programme was designed to monitor the level of dust leaving the quarry site boundaries over the course of a year. The programme was run by an independent specialist. Following the year-long programme, ECAN, the Canterbury District Health Board [CDHB], and CCC established the sensitive boundary monitoring to have constant monitoring of the dust levels leaving the quarry site boundaries and implemented requirements for dust management. As of August 2019 (ECAN, 2018), the air quality monitoring programme in Yaldhurst showed no serious public health risk to residents from airborne dust. However, ECAN acknowledges that nuisance dust from the quarries is still an issue for the community and committed to stricter dust monitoring and mitigation measures (ECAN, 2019).

In 2014 CCC published a series of community profiles, including Yaldhurst/McLeans Island. The profile combines 2013 census data and community surveys to profile the community's population, infrastructure, resilience, and key issues (CCC, 2014). An issue raised by the community in the profile was the environmental damage that quarrying directly causes and that large truck movements indirectly cause. CCC stated that they were working in partnership with ECAN to minimise environmental issues related to quarrying (CCC, 2014). No information was given on the outcome of this partnership.

4.8.3 Rehabilitation

The Yaldhurst Quarry cluster was all consented pre-plan change. This means that there were no requirements to have a rehabilitation plan and the majority of the quarry sites in the Yaldhurst cluster do not have council-approved rehabilitation plans.

Winstone Aggregates on Old West Coast Road has a CCC-approved Quarry Rehabilitation Management Plan. The plan outlines the rehabilitation objectives, gives a description of works, highlights mitigation measures, and outlines a process for review. The plan recognises that the surrounding area is generally rural in nature and that quarries have had a noticeable influence on the rural character of the surrounding area. It also recognises the limitations on the site, in terms of post-quarry land use, imposed by the sites' proximity to Christchurch International Airport and the landholding for the Christchurch Men's Prison (Winstone Aggregates, 2020). The main objective of the rehabilitation is that it is progressive; this means that small gravel pits are open at a time, and old gravel pits are rehabilitated while extraction continues elsewhere on the site. Progressive rehabilitation is considered best practice for quarry site rehabilitation (McLellan, 1983) and is recommended by CCC in the Quarry Rehabilitation Plan Guidance (2018). The strength of progressive rehabilitation is that it limits the footprint of the open area as far as practicable (Winstone Aggregates, 2020), which minimises dust and the visual and landscape effects of open pits (CCC, 2018). The Winstone Aggregates Quarry Site Rehabilitation Plan (2020) does not specify a post-quarry land use that the site is being rehabilitated for, instead it outlines what the proposed final landform will be to enable appropriate future land use. There is no evidence in the plan that the Yaldhurst community were consulted over the objectives or outcomes of the rehabilitation. There is also no mention of the effect that the rehabilitation will have on the surrounding community.

4.9 McLeans Island Case Study

4.9.1 Planning Context

The McLeans Island quarries are a group of quarries in the McLeans Island and Northern Yaldhurst area. There are seven quarries that this research will be considering: the McLeans Island quarries, as shown in figure 4.7, Harewood Gravels, Fulton Hogan and Isaacs Construction on McLeans Island Road as well as Road Metals on Coutts Island Road, SOL Quarries Ltd on Savills Road, Frews Quarries on Guys Road, and KB Quarries on Conservators Road. Four of the McLeans Island quarries were consented pre-plan change, Road Metal in 2009, Harewood Gravels in 2010, and Fulton Hogan and KB Quarries in 2013. Isaac Constructions, SOL Quarries, and Frews Quarries were all consented post-plan change in 2016.

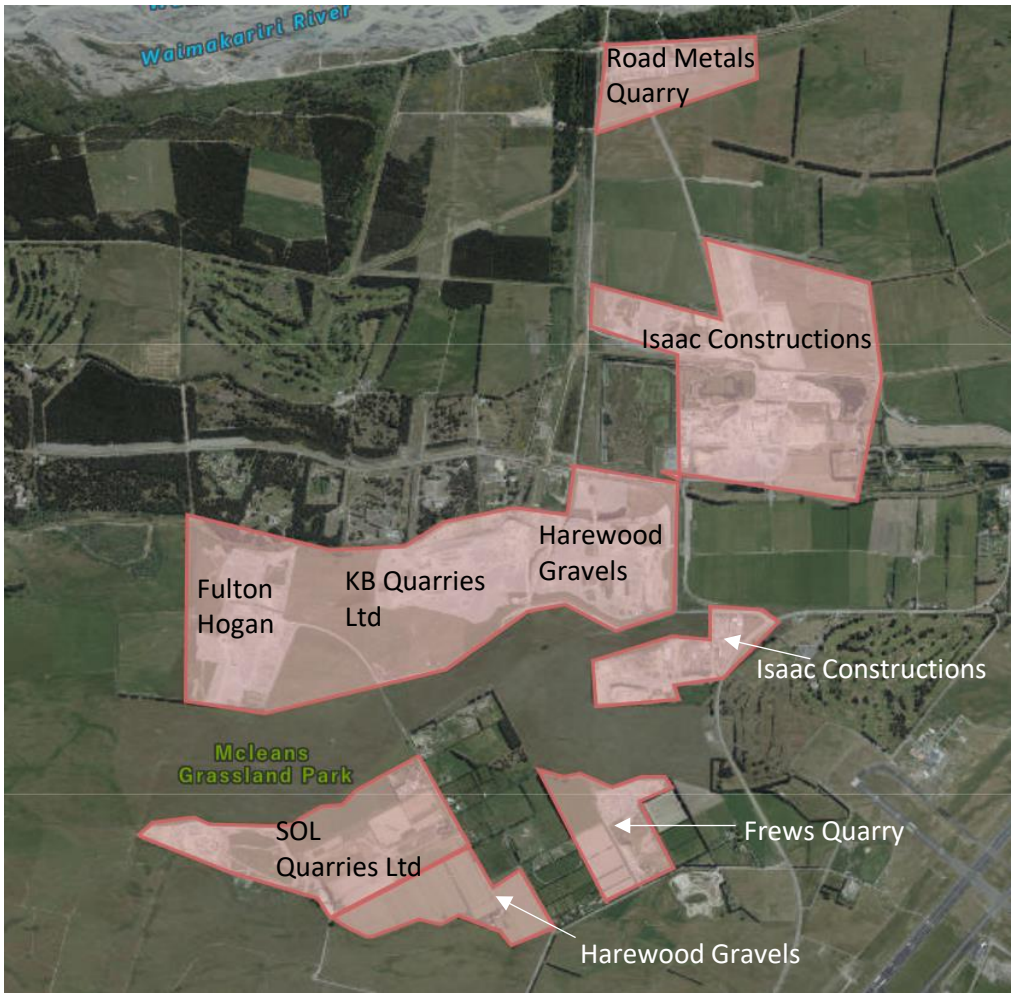

Figure 4.7: Map showing the McLeans Island Quarry cluster. The red boxes show the indicative area of the seven quarries in the cluster. Map modified from Canterbury Maps.

The seven quarries total 366 hectares in area and are all zoned as rural land. While the McLeans Island area is zoned rural, there are two different categories of rural zoned land that the quarries sit on. These are the Rural Quarry Zone and the Rural Waimakariri Zone. The quarries sit in the Christchurch Airport Protected Area, shown in Figure 4.6, meaning that the activities that can be consented to in the area are limited. The land surrounding the McLeans Island quarries is largely used for rural activities, such as farming. However, a portion of the surrounding land is zoned open space. Land zoned for open space forms a network of public and private land that provides open space and recreation facilities to meet the current and future needs of the Christchurch community (CCC, 2015). The McLeans Island open space comprises public open space for walking and biking, Orana Wildlife Park zoo, a Pistol Club and shooting range, three golf courses, and other private land uses like a train museum, car clubs and dog kennels.

4.9.2 Current State

The 2013 consent approvals of Fulton Hogan and KB Quarries followed by the 2016 approval of Isaac Constructions, SOL Ltd, and Frews caused outrage among McLeans Island residents due to the quarries proximity to existing dwellings. The consenting of these quarries caused anger among the residents of a pocket of 11 houses that were now largely surrounded by quarry site, as can be seen in figure 4.6. In most cases, the quarries were consented less than 250 metres from the properties boundaries, and in some cases the quarries were consented less than 40 metres from the boundary (Mitchell, 2017). Similar to Templeton, the main issue for residence with quarries that close is the dust and the health effects caused by the possible presence of crystalline silica. In 2017 the Yaldhurst Residents Association called a moratorium on new quarry consents until issues with residents could be sorted out (Mitchell, 2017), however, this never happened.

4.9.3 Rehabilitation

The McLeans Island quarries were consented both pre- and post-plan change. Road Metals, Harewood Gravels, Fulton Hogan and KB Quarries were all consented pre-plan change and were not required to have a Quarry Site Rehabilitation Plan. However, Isaac Construction, SOL Quarries, and Frews Quarries

were all consented post-plan change and were required to submit a Quarry Site Rehabilitation Plan with their consent application to Christchurch City Council.

In 2019 SOL Quarries applied for consented to expand the existing quarry they had on Savills Road by 42 hectares, bringing the total site to 66 hectares. In order to get consent for the expansion, SOL had to rewrite their Quarry Site Rehabilitation Plan to cover the proposed new quarry area. The plan outlines the Rehabilitation Programme, including cleanfill, timescale, proposed final landform, and land use following quarry operations. Similar to the Winstone Aggregates Rehabilitation Plan, SOL will progressively rehabilitate the site in conjunction with completed stages (SOL, 2019). The timeframe for completing rehabilitation on both the existing site and the extension is 2029 for the existing site and 2039 for the extension. The final landform of the site will provide an irregular slope pattern to create a more natural appearance. The SOL Quarry Rehabilitation Plan provides a table, figure 4.8, of possible post-quarry land uses and for each use assesses the advantages, constraints, and requirements for each option. The plan recognises that the final land use will not be determined until sometime in the future to allow for zoning changes and population changes to be taken into account (SOL, 2019). The plan recognises that the site could support both ecological restoration or recreational purposes; however, approval from Christchurch Airport would need to be sort particularly regarding the risk of a bird strike (SOL, 2019).

Christchurch District Plan (2014) designates a large area of land for Christchurch Airport bird strike protection (Canterbury Maps, 2020). This area has special restrictions around creating new water bodies in order to prevent large numbers of birds from gathering near the airport and potentially causing damage to aircraft via bird strike. All seven of the McLeans Island quarries are located in the Bird Strike Protection Area, as shown in figure 4.6. This means that there are restrictions regarding what post-quarry land uses can be for the rehabilitated quarry site, particularly when considering turning quarries into community recreation facilities and ecological restoration.

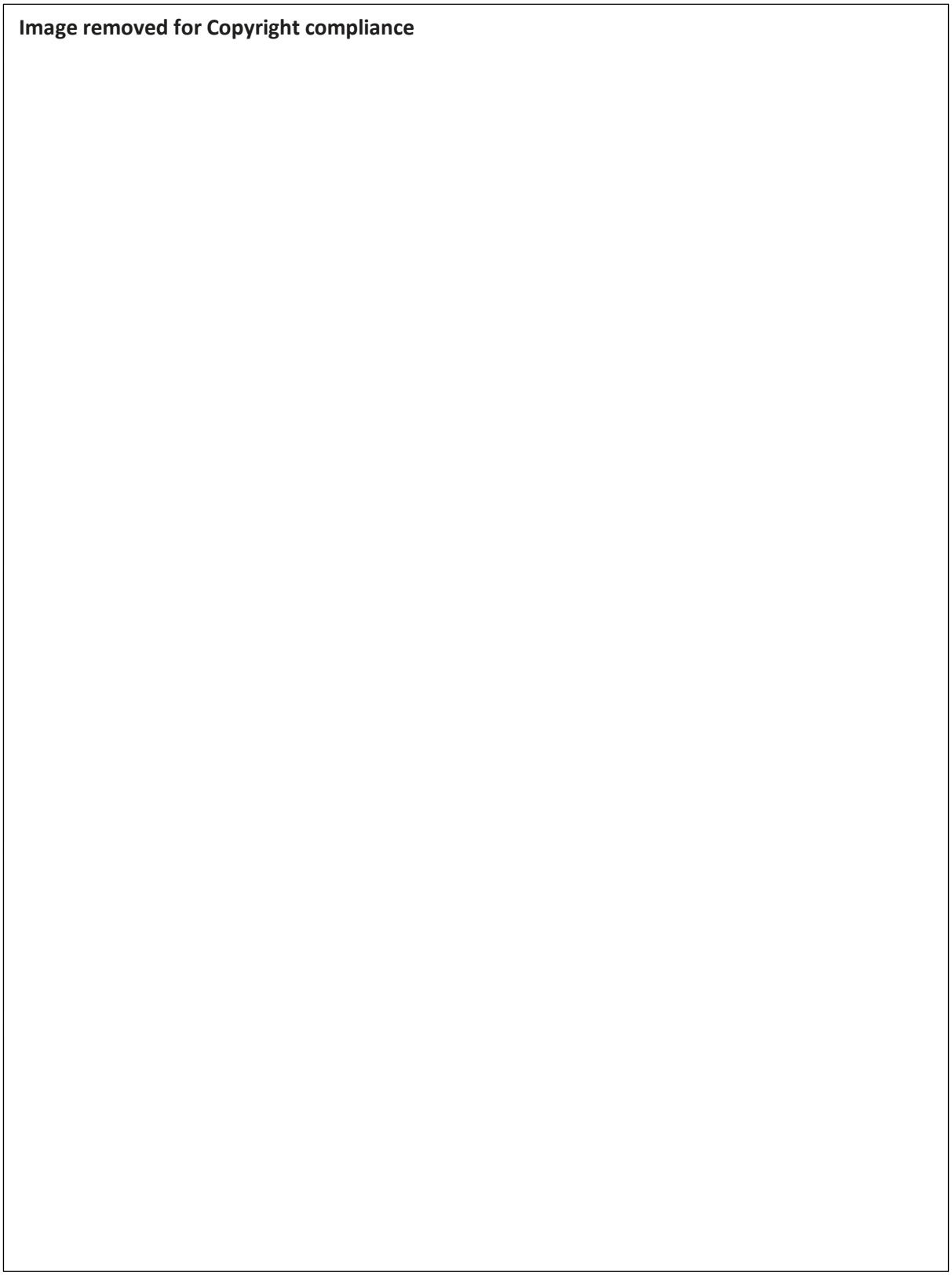

Figure 4.8: Table showing the proposed post-quarry land use options for the McLeans Island SOL Quarry site. Table taken from SOL Quarry Ltd Quarry Rehabilitation Plan (SOL Quarry Ltd, 2019, p 12-13).

4.10 Summary

The results of the policy analysis and mapping out the consent processes show that there is only one opportunity for public participation in the resource consent process and two opportunities in the private plan change process. In both processes the participation is done at the end of the process, and it is achieved through consultation. Analysing the Christchurch District Plan (CCC, 2015) revealed that there are two categories of quarries in CCC, pre-plan change and post-plan change. The most important distinction between the two categories is the requirement for rehabilitation plans.

The document analysis from the three case studies revealed that in two of the three quarry areas, Templeton and Yaldhurst, all of the quarries are pre-plan change and had no requirement to have a rehabilitation plan when they gained consent. Secondly, the document analysis showed that there is a large amount of community conflict surrounding quarrying in CCC. The majority of the conflict stems from the proximity of the quarries to property boundaries and the health effects caused by crystalline silica dust (Mitchell, 2017). The conflict is largely centred in the Yaldhurst and McLeans Island quarry areas, as in these areas quarries are as close as 40 meters from property boundaries (Mitchell, 2017) and the recommended setback from quarries is 250 meters due to the danger associated crystalline silica dust (Daniels, 2017). Lastly, the analysis of the two rehabilitation plans found that rehabilitation planning in the CCC quarry areas is done without any public participation.

Chapter 5

Discussion

5.1 Introduction

This research has been conducted to understand the quarry consent process and the role that public participation plays in it. In this chapter I discuss the results of this research. This discussion has been divided into three main themes; NIMBY: Satire or Genuine, Birds and Racecars, and not all talk: encouraging public participation. To discuss these I have drawn upon the literature reviewed and the results found through document analysis.

5.2 NIMBY: Satire or Genuine? The Reality of Community Conflict

In the literature, Sezer and Luloff (2003) discussed the term NIMBY in relation to a proposed limestone quarry in a small town in Pennsylvania. Sezer and Luloff (2003) discussed NIMBY attitudes relatively negatively, similar to the satirical and sarcastic tone that other literature, Luloff, Albrecht, and Bourke (1998), take regarding the concept of NIMBY. When considering gravel quarrying in Christchurch, the neighbouring community can be included in the NIMBY definition defined by Luloff, Albrecht, and Bourke (1998) of local opposition to noxious or undesirable activities. However, the satire and negative rhetoric associated with NIMBY seems unjustified. Respirable crystalline silica has been proven to cause significant health issues, including silicosis, a fatal disease linked to the long-term inhalation of crystalline silica. In some instances, in both the Yaldhurst cluster and the McLeans Island group, quarries are within 40 metres of neighbouring property boundaries (Mitchell, 2017) and 150 metres from the doorstep of houses (Daniels, 2017). The recommended distance from property boundaries when there is evidence of crystalline silica is 250 metres, and the Environmental Protection Authority Victoria (EPA Victoria) indicate that the greatest intensity of dust impacts will typically be within 100 metres of a source (Daniels, 2017). When speaking to Fair Go, the residents of Yaldhurst emphasised that they, “understand the need for gravel and have no problem with quarries making a living like this, they would just like the quarries to be further away” (Higgins, 2020).

The conflict between the quarry companies and the community seems inevitable for the rest of the lifespan of quarrying on these sites. Hodge (2014) describes a paradox in mining communities in Australia that mining companies are continually improving their environmental and social performance, but community conflict is still increasing. There is a parallel to this paradox that can be drawn in Christchurch: the quarry companies are meeting all of ECAN's air quality standards, and yet the residents are still saying it is not enough. How do you prevent community conflict and approach justified NIMBY attitudes? The major complaints of the Yaldhurst Residents Association are the proximity to residential properties that CCC has allowed quarries to be consented (Higgins, 2020). As previously stated with McLeans Island, the new SOL Quarry was consented within 40 metres of a neighbouring property boundary, and the Yaldhurst cluster operates within 200 metres of about six homes (Daniels, 2017). Due to the levels of dust that have been found to be in the air in the Yaldhurst area, in particular EPA Victoria suggests and the residents are calling for 500 metre setbacks between quarries and residential properties. This idea could shift the current paradox in the area to more of a relationship between quarry companies and communities that Bebbington (2014) discusses. By mandating in the future that quarries in Christchurch need 500 metre setbacks from residential, the community will have fewer issues with the dust, and the complaints from the community will shift focus to issues that encourage better industry standards.

5.3 Birds and Racecars: The Limitations and Opportunites of Post-Quarry Land Use

Prior to the 2014 CCC District Plan change, there were no requirements for companies to formulate or submit quarry site rehabilitation plans. Part of the outcome of the plan change was to mandate that all new quarry applications had a comprehensive and integrated quarry site rehabilitation plan as part of the consent application. Additionally, historic quarries that hold pre-plan change consents were given two years to submit a quarry rehabilitation plan (Emma Chapman, personal communications, Jan 19 2021). This was not written into the rules in the plan change and was rather a mandate by the council to attempt to gain control of the pre-plan change category of quarries. However, with the exception of Winstone Aggregates (2020), the historic quarries did not submit quarry site rehabilitation

plans, claiming that as they had consents under the old rules, they had existing use rights (Emma Chapman, personal communications, Jan 19 2021).

While the introduction of mandatory quarry site rehabilitation plans are a positive addition to the Christchurch quarry industry, the examples of Winstone Aggregates and SOL's Rehabilitation Plan reveal a flaw in the approach to rehabilitation plans. Neither the Winstone Aggregate nor the SOL rehabilitation name a specific post-quarry land use. SOL Quarries rehabilitation plan provides a table of possible post-quarry land uses, figure 4.8, however, leaves the decision of the end-use open to allow for zoning changes and demographic changes. Part of the integrated rehabilitation plan process is that the sites get infilled with cleanfill and topsoil and planted with shrubs and grass (CCC, 2018). Cleanfill is a finite resource and is in high demand nationwide due to the building boom and road development (Boyack, 2019). The issue with allowing quarry rehabilitation with no end goal is that large amounts of cleanfill are used to infill the sites, but depending on the end use, this may not be needed. The site could be used for ecological restoration or recreational purposes without the need for large quantities of cleanfill, as long as the site was free-draining. Having a clear goal for rehabilitation from the outset of the quarrying could reduce the use of cleanfill and this could reduce some of the pressure on the resource.

The Yaldhurst Quarry cluster poses an interesting challenge for quarry rehabilitation. The Yaldhurst Quarry cluster is compacted in 365 hectares, all neighbouring each other, shown in figure 4.4. This means that any post-quarry land use on rehabilitated sites will need to be able to co-exist with still operational quarries. While the Winstone Aggregate Rehabilitation Plan does not give a final proposed land use, it does list permitted activities on the site that would be suitable. However, of the nine activities on the list, seven seem to be unrealistic with the crystalline silica dust exposure that occurs close to operation quarries. In particular, the options of recreational activities and a golf course or driving range which are possible post-quarry land uses (Winstone Aggregates, 2020), would put people at risk of exposure to the crystalline dust. Additionally to the nine listed options, the Winstone Aggregate Management Rehabilitation Plan also indicated that there would be the opportunity to seek resource consent for six rural residential properties on Old West Coast Road. These properties would

back on to the six remaining quarries and pose a risk to the residents' health as well as reverse sensitivity risks from the dust, noise, and shaking, similar to what the current residents experience (Mitchell, 2017). While long-term, once quarrying activity is winding down on all seven Yaldhurst sites, these options are viable and could be assets to the community. For sites like Winstone, which will be the first to finish up quarrying activity, it is more likely that the land will be used for an activity that suits being neighbours with an operational quarry, such as agriculture and light grazing.

The rehabilitation of the quarries in Christchurch is faced with an added limitation of the Christchurch Airport Bird Strike Protection Area, shown in figure 4.6. The Christchurch Airport Bird Strike Protection Area is a safety-focused zone mandated by the Christchurch Airport in order to minimise the risk of bird strike to aircraft and protect human life (Christchurch International Airport Limited, 2021). The bird strike protection zone is a limitation for rehabilitation as it means that the post-quarry land use cannot introduce water features, such as lake or wetlands to the site, as it would encourage birdlife to the area. This is a limitation as there are successful overseas and New Zealand examples that require less infill than most other post-quarry land use options. Baldwin's Quarry, about 75km south of Central Auckland, is a New Zealand example of a successfully rehabilitated quarry turned into an engineered wetland. The project was hailed as a win/win for the quarry rehabilitation and for the local community (Quarry Magazine, 2020). The runoff from surrounding farms is naturally filtered through the Baldwins Quarry wetland, the runoff from the remaining quarry also gets filtered through the wetland, and the rehabilitated quarry also requires less infill. It becomes a valuable part of the environment providing an ecosystem for fish and birds (Quarry Magazine, 2020). While areas like this would benefit the rural areas of Christchurch that surround the current quarry areas as both ecological restoration and a recreation area, they are not possible in the Christchurch Airport Bird Strike Protection Area.

In 1953 a plan was approved to take advantage of the natural amphitheatre of a historic quarry site in Auckland and turn it into Mt Smart Stadium (Aggregate and Quarry Association, 2021). A similar plan is rumoured to have been proposed for the Ruapuna Speedway in Templeton, shown in figure 4.1, to move into the Fulton Hogan Pound Road Quarry once extraction work is complete. The current

speedway sits on 40 hectares of relatively flat land with few natural noise buffers and has been subject to numerous noise complaints from the surrounding community since 2009 (Law, 2017). The rumour of the proposed land swap would take advantage of the slope and battered side of the natural amphitheatre as noise buffers, as well as embankment seating for the speedway. The rumoured land swap between Ruapuna Speedway and Fulton Hogan Pound Road Quarry has been circulating for a number of years; however, CCC has not received a formal proposal (Emma Chapman, personal communications, Feb 24 2021). Mt Smart Stadium and the rumoured move of Ruapuna are exceptional opportunities for the quarry industry as they take advantage of the landform created by quarrying without the need for infill, which protects cleanfill as a resource and is less expensive for the quarry companies. They also create community facilities, such as cultural and music venues like Western Springs Stadium, that would not otherwise be possible in a flat city, like Christchurch.

5.4 Not All Talk: Encouraging Public Participation

This research aimed to research the cross-section between community conflict and rehabilitation in quarrying in Christchurch and ascertain whether public participation could solve the community conflict. The results showed that in the consent process for quarry consents only has one opportunity for the community to participate in the process. It is clear that this is not enough participation as the community conflict continues to grow. More participation is needed in Christchurch quarry consenting, as the number of locations that quarries will have large separations from residential or peri-urban housing is limited. This participation should sit in the involved section of the IAP2 Spectrum of Public Participation (IAP2, 2018), Figure 1.2.

The reason for moving from the current level of participation, that largely falls into the Inform and Consult sections, towards Involve (IAP2, 2018) is the best option for the quarry industry as the quarry company remains in the expert role, which is important for a technical operation like quarrying, but the communities' concerns are heard and addressed at every step of the process. Taking an Involve (IAP2, 2018) approach is still important as it may reduce some of the small-scale conflicts regarding operating hours, noise, and traffic, and it aids in creating open lines of communication for the bigger picture issues.

Part of the focus of this research was to consider whether a more Collaborative (IAP2, 2018) approach to rehabilitation would help reduce community conflict. The two Quarry Site Rehabilitation Plans investigated in this research, Winstone Aggregates (2020) and SOL Quarries (2019), were made without consultation with the community. In theory, collaborating with the community on rehabilitation plans is a good approach to public participation, however, in practice, it is fundamentally flawed. In Christchurch, Quarry Site Rehabilitation Plans are a requirement to gain resource consent, post-plan change. This means that the rehabilitation plans are being made before the quarries have the green light to go ahead. For community members to participate in the rehabilitation planning process at that stage of the resource consent process would mean that on some level, the community would need to accept that the quarry will go ahead in their area, and that is unlikely if not impossible.

Another issue to this approach that this research highlighted, is that quarry companies often deliberately leave the post-quarry land use open to allow for a change in policy and demographics. Realistically the post-quarry land use would be the key section that would draw the most community interest, so not creating one defeats the purpose of involving the community. The risk would become that quarry companies would collaborate with the community and establish an elaborate post-quarry land use that benefits the community, and the community holds on to this idea for the 30-year lifespan of the quarry only for the quarry company to meet the basic rehabilitation requirements and then sell the land. The Holcim Cape Foulwind Quarry is an example of this situation. The 150-hectare quarry located in Tauranga Bay near Westport in the West Coast of the South Island of New Zealand was in operation from 1958 to 2016, producing 900,000 tonnes of limestone and marl annually. Holcim, the quarry company, in collaboration with the community, created a rehabilitation plan that involved turning the site into a lake surrounded by native forest and wetland for public use (Naish, 2021). The rehabilitation plan garnered numerous environmental awards. However, in 2020 at the completion of the basic site rehabilitation to meet the standards set by the Buller District Council, Holcim sold the land to an Auckland housing developer. The community that was promised an award-winning public

recreation and ecological restoration site felt short-changed and lied to (Niash, 2021). Examples like the Holcim Quarry change the concept of collaborating with the community on rehabilitation plans from a Collaborative Model in the IAP2 (2018) Spectrum of Public Participation to more of the idea on Manipulation in Arnstien (1969) Ladder of Citizen Participation.

Any approach to public participation in quarry processes is likely to end in community conflict, as it is attempting to mediate between two starkly different land uses, gravel extraction and residential land use. Further to this, more participation is unlikely to prevent conflict. It is likely that conflict is inevitable when it comes to quarrying in Christchurch as it has major effects on the lives, health, and life expectancy of the surrounding community. However, the community still deserve to have more of a say in the quarry consenting processes as their livelihoods are significantly affected by the quarry for a long period of time. As discussed earlier, an Involve (IAP2, 2018) model is the best approach to public participation and would enable public participation in the rehabilitation planning despite the challenges.

5.5 Summary

Drawing together the results in Chapter 4, with relevant literature presented in Chapter 2, I have presented a discussion on community conflict, limitations and opportunities for post-quarry land use, and encouraging public participation. In this chapter I have discussed the genuine nature of the community concern and the often dismissive attitude of those in power. I have suggested that a move to an Involve (IAP2, 2018) public participation model will enhance public participation and be better equipped to address community concerns. Moving to an Involve model will allow the quarry companies to retain control of the decision making while introducing more opportunities for public participation in both the quarry planning process and the rehabilitation planning process. The biggest challenge in trying to enhance public participation are the challenges that come from mediating between two starkly different land uses, gravel extraction and residential land use.

In terms of rehabilitation, there are many opportunities for post-quarry land use as well as some large limitations. The biggest limitation for quarry rehabilitation in Christchurch is the Christchurch Airport Bird Strike Protection Zone, shown in figure 4.6, which restricts the introduction of new water bodies.

Restricting new water bodies limits rehabilitation opportunities such as ecological restoration and establishing new wetlands. An interesting opportunity for post-quarry land use in CCC is using the landform created by the quarrying activity as a natural amphitheatre for sporting and community facilities.

Chapter 6

Conclusion

6.1 Introduction

This research has set out to understand the quarry consent process in CCC, the role of public participation, and the opportunities to enhance public participation in the quarry planning and consent process. Three case studies of Templeton, Yaldhurst, and McLeans Island were examined to paint a picture of the current quarry and public participation situation in CCC. Together with the consent processes and plan analysis, the results demonstrated that there is a lack of public participation in quarry consent processes in CCC and highlights the opportunities to enhance public participation. In this chapter I will provide a summary of findings, give recommendations on how to reduce community conflict surrounding quarrying in CCC and enhance public participation, and finally give suggestions for future research opportunities based on the findings of this research.

6.2 Summary of Findings

- *At what stages of the quarry consent process does public participation occur?*

In the resource consent process, which is the most common approach to quarry consents in CCC, there is one opportunity for public participation: the public notification of the consent. This opportunity occurs as one of the last stages of the resource consent process after the quarry planning, including the rehabilitation planning, is complete. In the private plan change process there are two opportunities for public participation, the first and second rounds of submissions. Similar to the resource consent process, these happen at the end of the process.

- *What opportunities are there to enhance public participation in the quarry consent process?*

The primary way to enhance public participation in the quarry consent process is to involve the community earlier in the process. Involving the community earlier would give the community an

opportunity to aid in the development of quarry plans. It would also allow the community to have a larger say in the issues such as setbacks, dust mitigation, and rehabilitation planning.

This opportunity does not come without its challenges. Involving the community in the planning process would require the community to buy in to the idea that the proposed quarry will get consent. Due to the effects that the quarry will have on the community's health and quality of life, it is unlikely that the community buy-in required for an involved approach would be possible.

6.3 Recommendations

The key recommendation of this research is the need for an Involve (IAP2,2018) approach to public participation in the quarry consent process. Currently, there is only one opportunity for public participation in the resource consent process and no mechanisms for participation in the planning process for the rehabilitation plans. The current opportunity for public participation falls into the Consult category (IAP2, 2018), Figure 5.1. While a consult model allows the community to give opinions of the plan, it does not allow for the community to be involved in the planning process. Moving to an Involve (IAP2, 2018) approach would give the community more meaningful input in the quarry and rehabilitation planning process. An Involve approach still allows the quarry operator to have an expert role in the planning process and gives the community the ability to have their opinions heard at every stage of the process. Moving to this type of public participation draws on the first of the three public participation rationales set out by Wesselink, Paavola, Fritsch, and Renn (2011), Instrumental. The instrumental works on the theory that public participation makes decisions more legitimate and improves results; it does this by creating community ownership which limits future challenges.

Another recommendation from this research is mandatory 500-metre setbacks between houses and quarries. The major complaint of the neighbouring community is the proximity to residential properties that CCC has allowed quarries to be consented. This complaint is understandable considering the health issues that the respirable crystalline silica dust can cause. The EPA Victoria's industry standard is 250-metres from property boundaries and suggests that Christchurch needs to consider 500-metre setbacks, which is what the community is calling for (Daniels, 2017). In short, the community are okay with quarrying activity being in the proximity of their backyards, just not on their backdoor steps. A

mandatory 500-metre setback from houses and 250-metre setback from property boundaries allows neighbouring properties to enjoy their homes safely without wasting large amounts of viable quarry land.

6.4 Future Research

Future research that could follow this research is an interview-lead research method with similar research questions and objectives. The value of this additional research would be the input from both the community and the quarry companies on the current quarry resource consent process and rehabilitation planning process. This kind of research would need to take place before any significant change to the current quarry resource consent process took place. The goal of this research would primarily be to investigate what the community thinks of the current process, and whether they would want more input or if once the setbacks that they are demanding (Daniels, 2017) are put into place, they are happy for the system to be left alone.

A long-term research project could be established to follow a quarry using the Involve (IAP2, 2018) method during the quarry consent process. This research would follow the quarry and rehabilitation planning process as well as the quarry consent process. These processes would all be done with the involvement of the local community. Two of the objectives of the research could be to compare the current standard quarry consent process and the Involve (IAP2, 2018) quarry consent process to investigate if the involvement of the community can reduce community conflict and, in the long run, yield better results. The second objective of the research could be to look at the quarry site rehabilitation planning and investigate what a quarry site rehabilitation plan looks like when the community is involved in the creation of it.

6.5 Limitations

The most significant limitation of this research is the exclusion of interviews due to the restriction of the Covid-19 pandemic. In New Zealand, the largest of the three lockdowns ended before this research started; however, in planning this research, the overseas risk of Covid-19 was still extremely high. Interviews in a Covid-19 world would have been put the interviewer and the interviewee at risk. For

this reason, the call was made to proceed with this research without interviews to ensure there were no disruptions to the research. While having a document-focused research is a limitation of this research, during the course of this research, New Zealand had a further two lockdowns and not having to manage interviews meant that this research could continue without disruption.

Another limitation of this research is the focus on Christchurch. Christchurch currently has several issues with community conflict and quarrying. However, the issues in Christchurch are somewhat temporary. CCC is majority residential, and due to urban spread, the amount of land available for new quarrying activity is shrinking. The results, discussion and recommendations of this research have focused on quarrying practices in CCC; however, the resource consent process is a national system. Therefore, the recommendations that apply to the evolution of the resource consent process can be applied to the quarry consent process nationwide.

The final limitation of this research is the inclusion of only two Quarry Site Rehabilitation Plans. In CCC any quarry that gained consent post-plan change would have had to submit a Quarry Site Rehabilitation Plan, specifically the Isaac Constructions, SOL, and Frews Quarries. Additionally, several pre-plan change quarries have completed Quarry Site Rehabilitation Plan, including Winstone Aggregates. The two Rehabilitation Plans used in this research, SOL Quarries and Winstone Aggregates, were provided by Senior Consent Planner at CCC, Emma Chapman (personal communications, 2021). However, to get any more of the Rehabilitation Plans would have required an Local Government Official Information and Meetings Act 1987 (LGOIMA) request. An LGOIMArequest is a lengthy process and was not possible in the time given.

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